THE RELATIVE NUMBER OF MALE AND FEMALE CRESCENTS

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(*Received for publication* 30 *January*, 1924)

Most of the standard text-books contain little, if any, information on this subject, or at least what there is, is confined to some general statement unsupported by satisfactory data. A search through the literature, not an exhaustive one we admit, has furnished us only with two records.

Knowles (1919) gives the following table :—

TABLE I.

Date	Total number of crescents counted	Macrogametocytes	Microgametocytes
25.11.17	27	23	4
27.11.17	56	49	7
28.11.17	29	25	4
29.11.17	19	18	1
30.11.17	45	41	4
1.12.17	31	29	2
2.12.17	26	25	1
3.12.17	3	3	0
7.12.17	16	15	1
11.12.17	14	14	0
12.12.17	4	4	0
13.12.17	9	8	1

Although the number of crescents counted by Knowles is small, yet on all occasions he found the females in excess, and if we take the average of his figures we get the values, females 21, males 2, i.e., the females are ten times as numerous as the males.

We have compiled the following table from the data given by Abrami and Senevet (1920), but have omitted the figures they give showing the corrections for the statistical error, as the number of crescents counted was sufficient in most cases to exclude any large error due to this cause.

TABLE II.

Section I.

Date.	Total number of crescents counted	Females %	Males %
25.10.20	1500	52	44
26.10.20	1500	47	51
27.10.20	1500	41	53
28.10.20	1000	52	44
31.10.20	400	45	47
1.11.20	200	56	38*
2.11.20	83	55	38
3.11.20	85	62	30

Section II.

	175	59	29
	1015	56	41
	400	71	23
	200	76	19

* The author's figure is 27·7, probably a misprint for 37·7.

The first section of the table refers to the same case counted on various days, and the second section to four separate cases. It will be noted that the percentages do not add up to exactly 100, as the authors found that in certain cases they were unable to decide whether a crescent was a male or a female.

If we now take the average of the figures in the first section we get the following values : Females 51, males 43 (1·2 to 1).

It is noteworthy that on three occasions the males were in excess.

In the second section of the table we find that the figures for the females and males vary considerably, the females, however, being always in excess. If we take the average, the figures are, females 65, males 28 (2·3 to 1).

The counts made by ourselves were on a series of thin blood films sent to one of us by Dr. E. A. C. Smith, Federated Malay States. It may be of interest to state that they were made from the blood of a case of general paralysis of the insane, inoculated with simple tertian malaria (*P. vivax*) on 11 July, 1923. Simple tertian parasites appeared in the blood on 25 July, 1923, and crescents on 4 August, 1923 (the source of the *P. falciparum* infection is obscure), and in nearly all the films were so abundant that 1,000 crescents could be easily counted. Our experience has been similar to that of Abrami and Senevet, that occasionally we were unable to decide whether a crescent was a male or a female. If the films were deeply stained there was a tendency to call females male, and in such films care was required in distinguishing them, but in less deeply stained films the distinction was well-marked.

The figure for these doubtful elements, which was certainly less than 5 per cent., we have omitted from our counts.

Five hundred crescents were counted in each film by each of us, the one not knowing previously the figure obtained by the other. The difference in individual counts ranged from 4 to 15 per cent. ; the average being about 10 per cent. This may be due to the fact that the proportion of females to males varied in different parts of the film, or may be due to a difference in interpretation.

The results obtained by us are given in Table III.

Table III.

Date	Total number of crescents counted	Observer A. Percentage of		Observer B. Percentage of	
		Females	Males	Females	Males
5.8.23	500 + 500	72	28	76	24
6.8.23*	500 + 500	70	30	85	15
8 a.m.					
6.8.23*	500 + 500	73	27	88	12
3 p.m.	500	75	25		
7.8.23*	500 + 500	72	28	76	24
3 p.m.					
8.8.23*	500 + 500	67	33	78	22
3 p.m.					
9.8.23*	500 + 500	66	34	76	24
3 p.m.	500	68	32		
10.8.23*	500 + 500	68	32	78	22
3 p.m.					
12.8.23*	500 + 500	72	28	82	18
3 p.m.					
14.8.23*	500 + 500	66	34	74	26
8 a.m.					
Average		70	30	80	20

* Quinine hydrochloride grains 20.

From Table III we get the following average figures: for A, females 70, males 30 (2·3 to 1); for B, females 80, males 20 (4 to 1); and for A and B combined, females 75, males 25 (3 to 1).

Finally we summarize the observations in Table IV.

Table IV.

Authority	Case	Total number of crescents counted	Average ratio $\frac{\text{Females}}{\text{Males}}$
Knowles (1919)	Blood films made from 1 case on 12 different days.	279	$\frac{10}{1}$
Abrami and Senevet (1920)	(1) Blood films made from 1 case on 8 different days.	6268	$\frac{1.2}{1}$
	(2) One blood film from each of 4 cases.	1790	$\frac{2'3}{1}$
Stephens and Gordon (1924)	Blood films from 1 case on 9 days	10000	$\frac{3}{1}$

CONCLUSION

In a case observed by us on nine separate days, female always outnumbered male crescents, the average ratio being three to one.

REFERENCES

Knowles, R. (1919). Notes on a Monkey Plasmodium and on Some Experiments with Malaria. *Indian Journal of Med. Research*, Vol. VII, pp. 195-202.

Abrami, P., and Senevet, G. (1920). Apropos des gamètes du *Plasmodium praecox* proportion variable des éléments mâles et femelles. *Bull. Soc. Path. Exot.*, Vol. XIII, pp. 167-172.

ADDENDUM

In a blood film made on 15.11.23 by Dr. Govadham, Central Provinces, India, and received by us on 31.3.24, 1,000 crescents were counted. The ratio of females to males was 750 to 250, i.e., 3 to 1.